



Cambridge International Examinations
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CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/43

Paper 4 (Extended)

May/June 2016

MARK SCHEME

Maximum Mark: 120

Published

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Page 2	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0607	43

Abbreviations

awrt	answers which round to
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part Marks
1 (a) (i)	13205.2	1	
(ii)	13200	1	
(iii)	13210	1	
(iv)	13205.173	1	
(b)	120	1	
2 (a)	$(3x+2)(x-4)$	2	SC1 for $(3x+a)(x+b)$ where $ab = -8$ or $a+3b = -10$
(b)	$-\frac{2}{3} < x < 4$	2FT	B1 for either correct
(c)	221.8 or 221.8... 318.2 or 318.18 to 318.19	3	B2 for either correct or M1 for $\sin x = \text{their} \left(-\frac{2}{3} \right)$ where $-1 < \text{their} \left(-\frac{2}{3} \right) < 1$ or M1 for sketch or M1 for 41.8 or -41.8 seen
3 (a)	62.5	3	B1 for $y = k(x+1)^3$ B1 for $k = 0.5$ OR M2 for $\frac{y}{32} = \frac{(4+1)^3}{(3+1)^3}$
(b)	2	2	B1FT for $x+1 = \sqrt[3]{\text{their } 27}$
(c)	$x = \sqrt[3]{2y} - 1$ oe final answer	3	M1 for division by <i>their</i> k M1 for cube root M1 for subtracting 1, must be final step

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0607	43

Question	Answer	Mark	Part Marks
4 (a) (i)	$A = 4r^2 - \pi r^2$ oe final answer	2	M1 for $ar^2 - b\pi r^2$
(ii)	30.9 or 30.88 to 30.90[...]	1	
(b)	$8r + 2\pi r$ oe final answer	3	B1 for $8r$ oe B1 for $2\pi r$ oe If B0 scored then M1 for $r + r + \frac{1}{4} \times 2\pi r$ oe
5 (a)	$0.5 \times 12.4 \times x \times \sin 30 [= 34.1]$ oe	1	
(b)	6.21 or 6.205 to 6.206	3	B2 for 38.50 to 38.51 or M1 for $11^2 + 12.4^2 - 2 \times 11 \times 12.4 \times \cos 30$
(c)	62.3 or 62.4 or 62.33 to 62.41...	3	M2 for $\sin A = \frac{11 \times \sin 30}{\text{their } 6.21}$ or $\cos A = \frac{12.4^2 + (\text{their } (b))^2 - 11^2}{2 \times 12.4 \times \text{their } (b)}$ or M1 for $\frac{11}{\sin A} = \frac{\text{their } 6.21}{\sin 30}$ oe
(d)	6.2	2	M1 for $12.4 \times \sin 30$ oe
6 (a)	166 or 165.6 to 165.7	2	M1 for correct use of mid-pts at least 4 of (150, 157.5, 162.5, 167.5, 172.5, 182.5)
(b) (i)	2.6, 13.2, 16.4, 23.6, 16.4, 1.73	2	B1 for 4 or 5 correct
(ii)	Suitable vertical scale Correct column widths Correct heights	1 1 2FT dep	B1 for 4 or 5 correct dep on at least B1 in (b)(i)
7 (a)	90000	4	M3 for $1.05 \times 1.1 \times a = 103950$ or better M2 for $\frac{103950}{1.05 \text{ or } 1.1}$ oe or M2 for 1.05×1.1 M1 for $103950 = 105\%$
(b)	2028	3	M2 for $1.05^n = \frac{200000}{103950}$ where $n > 1$ or M1 for 103950×1.05^n where $n > 1$ If 0 scored SC2 for 13.4 or 13.41... seen

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0607	43

Question	Answer	Mark	Part Marks
8	(a) $6\mathbf{p} - \mathbf{q}$	2	B1 for $\overline{XD} = -\mathbf{q}$ or M1 for $\overline{AD} = \overline{AX} + \overline{XD}$ oe
	(b) $3\mathbf{p} + \mathbf{q}$ oe	2	M1 for $\overline{AC} = 9\mathbf{p}$ or $\overline{XC} = 3\mathbf{p}$ or correct route
	(c) $3\mathbf{p} - 2\mathbf{q}$ oe	3	M1 for $\overline{BD} = \textit{their (a)}$ M1 for $\overline{CB} = \overline{CD} + \overline{DB}$ oe
9	(a) $[QR =] P$ $[PQR =] Q$ $[ST =] Q$ $[SQ =] T$ $[PTP =] T$ $[TPP =] S$	6	B1 for each
	(b) (i) Points (2, 2) (2, 1) (5, 1)	2	B1 for (2, 1) or (5, 1) correct
	(ii) Points (2, -2) (2, -1) (5, -1)	1FT	FT their <i>B</i> reflected in <i>x</i> -axis
	(iii) Rotation 90 [anticlockwise] oe [Centre] (0, 0) oe	1 1 1	
10	(a) (i) Points correctly plotted	3	B2 for 4 or 5 correct points B1 for 2 or 3 correct points
	(ii) Positive	1	
	(b) (i) 32.7	1	
	(ii) 23.6	1	
	(c) (i) $[y =] -5.57 + 0.892x$	2	B1 for $-5.57 + kx$, or B1 for $a + 0.892x$, If 0 scored SC1 for $-5.6 + 0.89x$
	(ii) 21.2 or 21.19...	1FT	FT <i>their</i> (c)(i) using $x = 30$
	(iii) Outside range oe	1	

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0607	43

Question	Answer	Mark	Part Marks
11 (a)	Correct sketch	4	B1 Correct graph for $x > 3$ B1 Correct graph for $x < 1$ B1 Correct graph for $1 < x < 3$ B1 Approximately correct intercepts
(b)	$x = 1$ $x = 3$ $y = 3$	1 1 1	
(c)	(2, 2)	1	
(d)	1.38, 2, 3.62	3	B1 for each
12 (a)	18	2	M1 for $4x + 6x = 180$
(b)	18	2	M1 for $180 - 6x - 3x$
(c)	90	3	M2 for $180 - 3x - x - x$ or B1 for $CED = x$ or $DCE = 4x$
13 (a) (i)	4.71 or 1.5π or 4.712 to 4.713	2	M1 for $\frac{60}{360} \times \pi \times 3^2$
(ii)	12.5 or $1.5\pi + 4.5\sqrt{3}$ oe or 12.50 to 12.51	3	M2 for $0.5 \times 3 \times \frac{3}{\cos 60} \times \sin 60 + \text{their(a)}$ oe or M1 for $\frac{3}{\cos 60}$
(iii)	31.4 or $7.5\pi + 4.5\sqrt{3}$ oe or 31.35 to 31.36	3	B1 for hyp = 6 M1 for $\frac{60}{360} \times \pi \times (\text{their}6)^2$
(b)	263 or $31.5\pi + 94.5\sqrt{3}$ oe or 262.6 to 262.7	4	M3 for $1.5\pi + 6\pi + 24\pi +$ $4.5 \times \sqrt{3} + 18 \times \sqrt{3} + 72 \times \sqrt{3}$ or M1 for $1.5\pi + 6\pi + 24\pi$ and M1 for $4.5 \times \sqrt{3} + 18 \times \sqrt{3} + 72 \times \sqrt{3}$ or M1 for correct new triangle in diagram 4 or M1 for correct new sector in diagram 5 or M1 for correct new triangle in diagram 6

Page 6	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0607	43

Question	Answer	Mark	Part Marks
14 (a) (i)	$\left(\frac{x}{x+y}\right)^2$ oe final answer	2	B1 for $\frac{x}{x+y}$
(ii)	$2 \times \frac{xy}{(x+y)^2}$ oe final answer	3	M2 for $\frac{x}{(x+y)} \times \frac{y}{(x+y)}$ oe or B1 for $\frac{y}{x+y}$ seen
(b) (i)	$\frac{x(x-1)}{(x+y)(x+y-1)}$ oe final answer	3	B2 for $\frac{x-1}{x+y-1}$ or B1 for $x+y-1$ seen
(ii)	$2 \times \frac{xy}{(x+y)(x+y-1)}$ oe final answer	3	M2 for $\frac{x}{(x+y)} \times \frac{y}{(x+y-1)}$ oe or B1 for $\frac{y}{x+y-1}$ seen